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Trypanosomosis in pigs slaughtered at Bodija Abattoir, Ibadan, Oyo State, Nigeria

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ABSTRACT

This study investigated the prevalence of porcine trypanosomosis in pigs slaughtered at Bodija abattoir, Ibadan, Oyo State, Nigeria, between the months of March and May, 2017. Blood samples were obtained at the point of slaughter from 78 apparently healthy pigs of both sexes and different breeds and ages using standard field and laboratory techniques. 13 pigs were infected with trypanosomes representing an infection prevalence of 16.67%. *Trypanosoma simae* was the only species implicated. Age-specific prevalence in adults and growers was found to be 6.41 and 10.26% respectively. Prevalence according to breeds showed 14.10, 0.0, 0.0 and 2.57% for large white, Land race, Duroc and Hampshire respectively. There was a significant difference ($P < 0.05$), in age and breed prevalence. Sex prevalence recorded 8.98 and 7.69% for male and female pigs respectively. This, however was not statistically significant ($P > 0.05$). The study provides information on the trypanosomosis status of pigs that arrive for slaughter in the study area and has shown that more attention is needed in controlling trypanosome infection from the source farms.

Key Words: *Trypanosoma simae*, trypanosomosis, swine industry

1. INTRODUCTION

The swine industry has witnessed an unprecedented increase in production and consumption over the past decade and this situation is likely to continue (¹Sowemimo *et al*, 2012). There is no distrust that human food supply must be improved both in quality and quantity. Porcine trypanosomosis is not only of economic importance but also of public health importance, it is a major constraint to large scale and profitable pig production in protein-starved tsetse infected endemic areas (²Ngaoyo *et al.*, 2005; ³Waiswa, 2005). The occurrence of these trypanosomes not only due to the high pathogenicity of *T. simiae* that can lead to the death of the pigs (⁴Maudlin *et al.*, 2004) but also due to apparent clinical diseases and unapparent production losses, caused by *T. brucei* and or *T. congolense* especially in commercial pig farming systems (⁵Abenga *et. al*; 2004; ⁶Hursey, 2000; ⁷Swallow 2000). Several studies on animal trypanosomosis have been carried out in Nigeria. Such studies were carried out in the northern parts of the country (⁸Agu *et al.*, 1990; ⁹Kalu *et al.*, 1991; ¹⁰Kalu *et al.*, 1996; ¹¹Kalu and

Lawani, 1996; ¹²Onyia, 1997; ⁵Abenga *et al.*, 2004) and in the South (¹³Agu and Amadi, 2001; ¹⁴Ameen *et al.*, 2008; ¹⁵Fasanmi *et al.*, 2014; ¹⁶Okorafor and Nzeako, 2014; ¹⁷Okorafor *et al.*, 2016). However, natural trypanosomosis in pigs has not been adequately investigated, as emphasis is placed more on diseases in cattle. This has resulted to the exclusion of pigs from control campaign by governments and has enhanced their carrier status in the spread of trypanosomosis to man and animals. Trypanosomes of major threat to pigs include *Trypanosoma suis*, *T. brucei*, *T. simae*, and *T. congolense* (¹⁸Anene *et al.*, 2011). The aim of this work was to determine the trypanosome infection rates in pigs using animals brought for slaughter at the Bodija abattoir as a case study and to assess their carrier status.

2. MATERIALS AND METHODS

2.1. Study Area

The study was conducted at the Bodija Municipal Abattoir, the largest abattoir in Ibadan, Oyo State. Ibadan is the largest indigenous city in tropical Africa, it lies within longitude 07°02' and 07°40'E and latitude 03°35' and 4°10'N (¹⁹Udo, 1994). Pigs are usually bought by butchers from livestock traders and then transported to the abattoir for slaughter.

2.2. Blood sample collection and laboratory analysis

A total of 78 apparently healthy pigs of both sexes, growers and adults comprising of 4 different breeds (Large White, Land Race, Duroc and Hampshire) were randomly selected and bled. Two millilitres of blood were aseptically collected from the jugular vein of each animal. The blood from each animal was put into an Ethylene diamine tetra acetic acid (EDTA) tube, labelled accordingly and placed in an ice pack. All samples were taken to the Veterinary Parasitology Laboratory of the Faculty of Veterinary Medicine of the University of Ibadan for analysis.

For the purpose of parasitological examination, blood samples from the EDTA tubes were transferred into capillary tubes. One end of each of the capillary tubes was sealed with plasticine and spun in a microhaematocrit centrifuge at 1500rpm for 3-5minutes. The haematocrit tubes were then taken and cut at the buffer coat level to release the contents on a clean grease-free microscope glass slides to which a cover slip was placed for examination at X40 objective magnification for motile trypanosomes.

Thin film smears were also made from the EDTA blood samples, air dried, dithionite-soluble, fixed with methanol, stained with Giemsa and examined under the microscope at X40 objective magnification for demonstration of the different species of the trypanosomes.

2.3. Statistical Analysis

Descriptive and inferential statistics were employed in analysing the data in the study. The prevalence rates among breeds, age and sex of the animals were expressed as percentage of the total number of animals sampled. Chi square test was used to evaluate association between the prevalence of infection and breed, sex and age of the pigs studied. A P-value of $P < 0.05$ was considered significant. Inferential statistics was done using SPSS version 17.

3. RESULTS

Out of 78 pigs examined, 13 were infected with *Trypanosoma simae* with an overall prevalence of 16.67% (Table 1). Seven out of 32 male pigs examined were infected with a prevalence rate of 8.98%. Similarly, 6 out of 46 female pigs examined were infected with a prevalence rate of 7.69%. This, was not statistically significant ($P > 0.05$). Age prevalence showed that 5 out of 49 adult pigs examined were infected with a prevalence rate of 6.41%, while 8 out of 29 growers examined were infected with a prevalence rate of 10.26% (Table 2). Breed prevalence showed that 11 out of 57 large white pigs examined were infected with a prevalence rate of 14.10%, while 2 out of 15 Hampshire pigs examined were infected with a prevalence rate of 2.57%. However, none of the 3 land race and 3 duroc pigs examined was infected; hence, they both showed prevalence rates of 0.0% each (Table 3). There was a significant difference ($P < 0.05$), in infection prevalence in age and breed of pigs in the study area.

Table 1 prevalence of trypanosomes in the study population

Parameters	Number	Percentage (%)
Number of pigs examined	78	
<i>Trypanosoma spp.</i> (+ve)	13	16.67

Table 2 Age and sex prevalence of trypanosomes in pigs in the study area

Age	Total no.	Male		Female		Total
		No. examined (%)	No +ve examined (%)	No examined (%)	No +ve no. +ve(%)	
Adults	49	19	4(5.13)	30	1(1.28)	5(6.41)
Growers	29	13	3(3.85)	16	5(6.41)	8(10.26)
Total	78	32	7(8.98)	46	6(7.69)	13(16.67)

Table 3 Prevalence of trypanosomes among breed of pigs in the study area

Breeds	No examined	No Positive (%)
Large White	57	11(14.10)
Land Race	3	0(0.0)
Duroc	3	0(0.0)
Hampshire	15	2(2.57)
Total	78	13(16.67)

4. DISCUSSION

The prevalence rate of porcine trypanosomosis in this study is consistent with the 17.29% previously reported in ruminants slaughtered at Kaduna Abattoir Kaduna State, Nigeria (²⁰Samdi *et al.*, 2008), and 10.81% previously reported in pigs in Ibadan (¹⁷Okorafor *et al.*, 2016). This is also higher than the 3.9% reported in grazing cattle in Ogbomoso, Oyo state (¹⁴Ameen *et al.*, 2008). The 16.67% prevalence rate reported in this study suggests a continuous challenge by parasites and the existence of carrier state in most animals. The observed 16.67% parasitaemia for trypanosomes was higher than 3.81% reported by Okorafor and Nzeako¹⁶ (2014) in cattle slaughtered at Ibadan abattoir, the 8.4% reported by ²¹Enwezor *et al.*, (2009) in Kaduna state, Nigeria as well as the 8.0% reported by ²²Kamani *et al.*, (2010) in North-Central Nigeria. ²³Ogunsanmi *et al.*, (2000), had reported variations in trypanosome infection rates in different ecological zones, suggesting that climatic variations across different geographical regions and type of husbandry practices adopted could influence survival of both vectors and parasites.

In this study, trypanosome infection was found to be higher in growers (10.26%) than in adults (6.41%). This is consistent with the work of ¹⁷Okorafor *et al.*, (2016), who reported prevalence rates of 1.41 and 0.7% for growers and adults respectively. This, however, disagrees with the work of ²⁰Samdi *et al.* (2008), who recorded a lower prevalence (11.61%) in the young ones than adults (18.8%). The high susceptibility in growers may be due to lack of previous exposure to infection which leads to low immunity to resist infection (²⁴Urquhart *et al.*, 2003).

Although, there was no significant difference between sex and rate of infection, it was however observed that male pigs were more susceptible to trypanosome infection (8.98%) than the female pigs (7.69%). This is in agreement with the findings of ²⁵Kumar *et al.*, (2002), ¹Sowemimo *et al.*, (2012), ²⁶Okorafor *et al.*, (2013) and ¹⁵Fasanmi *et al.*, (2014). However, ²⁷Tamboura *et al.*, (2006) ¹⁶Okorafor and Nzeako (2014) and ¹⁷Okorafor *et al.*, (2016), reported higher prevalence among female animals than males. The lower prevalence in females could be because female pigs are kept as breeding stock and are always dewormed routinely. This, however, suggests that apart from sex, other host and environmentally related factors could play a role in influencing the susceptibility of animals to infections.

The breed prevalence showed that Large white and Hampshire were the only infected breeds with 14.10 and 2.57% respectively. The study showed that even though the duroc and land race were examined, they were found not to be infected. This might be attributed to the sampling technique. ¹⁷Okorafor *et al.* (2016), reported prevalence rates of 2.70, 6.76 and 1.35% for Duroc, Land race and large white.

5. CONCLUSION

The result of this study provides information on the threat of trypanosome challenge to pigs that arrive for slaughter in the study area. Pigs are of great economic importance in southern Nigeria. They serve as sources of protein and income. The prevalence rate of 16.67% recorded in this study may contribute to huge economic loss to people in the area. Therefore, this calls for increased monitoring, evaluation and control of the parasite in promoting livestock production.

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Authors' contributions

Ugochukwu Patrick Okorafor: This author conceptualised and designed the research work, and put together the manuscript for possible publication.

Cyprian Robinson Unigwe: This author assisted with the review of literature as well as the field and laboratory aspects of this research work.

Sharon Omolola Olukunle: This author was involved with the statistical analysis of the data got from this research.

Oluwasanmi Babatunde Odeyemi: This author assisted with the typesetting, editing and formatting of this research work.

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Declaration of conflicting interests

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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